

HF / VHF / UHF
All Mode Transceiver

FT-817/FT-817ND

Technical Supplement

©2005 VERTEX STANDARD CO., LTD.

(E137790B)

VERTEX STANDARD CO., LTD.
4-8-8 Nakameguro, Meguro-Ku, Tokyo 153-8644, Japan
VERTEX STANDARD
US Headquarters
10900 Walker Street, Cypress, CA 90630, U.S.A.
YAESU EUROPE B.V.
P.O. Box 75525, 1118 ZN Schiphol, The Netherlands
YAESU UK LTD.
Unit 12, Sun Valley Business Park, Winnall Close
Winchester, Hampshire, SO23 0LB, U.K.
VERTEX STANDARD HK LTD.
Unit 5, 20/F., Seaview Centre, 139-141 Hoi Bun Road,
Kwun Tong, Kowloon, Hong Kong

Introduction

This manual provides technical information necessary for servicing the Yaesu **FT-817/FT-817ND** HF & V/UHF-Bands Transceiver. It does not include information on installation and operation, which are described in the **FT-817/FT-817ND** Operating Manual provided with the transceiver, or on accessories which are described in their manuals.

The **FT-817/FT-817ND** is carefully designed to allow the knowledgeable operator to make nearly all adjustments required for various station conditions, modes and operator preferences simply from the controls on the panels, without opening the case of the transceiver. The **FT-817/FT-817ND** Operating Manual describes these adjustments, plus certain internal settings.

Servicing this equipment requires expertise in handling surface mount chip components. Attempts by unqualified persons to service this equipment may result in permanent damage not covered by warranty. For the major circuit boards, each side of the board is identified by the type of the majority of components installed on that side. In most cases one side has only chip components, and the other has either a mixture of both chip and lead compo-



nents (trimmers, coils, electrolytic capacitors, packaged ICs, etc.), or lead components only.

While we believe the technical information in this manual is correct, VERTEX STANDARD assumes no liability for damage that may occur as a result of typographical or other errors that may be present. Your cooperation in pointing out any inconsistencies in the technical information would be appreciated. VERTEX STANDARD reserves the right to make changes in this transceiver and the alignment procedures, in the interest of technological improvement, without notification of owners.

Contents

Specification	2
Exploded View & Miscellaneous Parts	3
Block Diagram	5
Interconnection Diagram	7
Circuit Description	9
Alignment	15

Board Unit (Schematics, Layouts & Parts)

MAIN Unit	25
PLL Unit	63
REF Unit	75
PA / FINAL Unit	81
PANEL Unit	99
VR Unit	109
TCXO-9 Unit (Option)	110

General

Frequency Range:

Receive: 100 kHz-30 MHz
 50 MHz-54 MHz
 76 MHz-108 MHz (WFM only)
 87.5 MHz-108 MHz (EU)
 108 MHz-154 MHz (USA)
 144 MHz-148 (146) MHz (Other markets)
 430 (420) MHz-450 (440) MHz

Transmit: 160-6 Meters
 2 Meters
 70 Centimeters (Amateur bands only)
 5.1675 MHz Alaska Emergency Frequency
 (USA only)

Emission Modes:

A1 (CW), A3 (AM), A3J (LSB/USB), F3 (FM),
 F1 (9600 bps packet), F2 (1200 bps packet)

Synthesizer Steps (Min.):

10 Hz (CW/SSB), 100 Hz (AM/FM)

Antenna Impedance:

50 Ohms, Unbalanced (Front: Type BNC, Rear: Type M)

Operating Temp. Range:

-10 °C to +60 °C (+14 °F to +140 °F)

Frequency Stability:

±4 ppm from 1 min. to 60 min after power on.
 @25 °C: 1 ppm/hour
 ±0.5 ppm/1 hour @25 °C, after warmup
 (with optional **TCXO-9**)

Supply Voltage:

Normal: 13.8 VDC ± 15 %, Negative Ground
 Operating: 8.0-16.0 V, Negative Ground
FBA-28 (w/8 "AA" Alkaline Cells): 12.0 V
FNB-72 (Ni-Cd Battery Pack): 9.6 V (Option)
FNB-85 (Ni-MH Battery Pack): 9.6 V (**FT-817ND**)

Current Consumption:

Squelched: 250 mA (Approx.)
 Receive: 450 mA
 Transmit: 2.0 A

Case Size (W x H x D):

135 x 38 x 165 mm (5.31" x 1.5" x 6.50")

Weight (Approx.):

1.17 kg (2.58 lb)
 w/Alkaline battery, antenna, w/o Microphone

Transmitter

RF Power Output:

5 W (SSB/CW/FM), 1.5 W (AM Carrier) @13.8 V

Modulation Types:

SSB: Balanced Modulator
 AM: Early Stage (Low Level)
 FM: Variable Reactance

FM Maximum Deviation:

±5 kHz (FM-N: ±2.5 kHz)
 -50 dB (1.8-29.7 MHz)
 -60 dB (50/144/430 MHz)

Carrier Suppression:

>40 dB

Opp. Sideband Supp.:

>50 dB

SSB Frequency Response:

400 Hz-2600 Hz (-6 dB)

Microphone Impedance:

200-10k Ohms (Nominal: 600 Ohms)

Receiver

Circuit Type:

Double-Conversion Superheterodyne

Intermediate Frequencies:

1st: 68.33 MHz (SSB/CW/AM/FM); 10.7 MHz (WFM)
 2nd: 455 kHz

Sensitivity:

	SSB/CW	AM	FM
100 kHz-500 kHz	-	-	-
500 kHz-1.8 MHz	-	32 µV	-
1.8 MHz-28 MHz	0.25 µV	2 µV	-
28 MHz-30 MHz	0.25 µV	2 µV	0.5 µV
50 MHz-54 MHz	0.2 µV	2 µV	0.32 µV
144/430 MHz	0.125 µV	-	0.2 µV

(IPO, ATT off, SSB/CW/AM = 10 dB S/N, FM = 12 dB SINAD)

Squelch Sensitivity:

	SSB/CW/AM	FM
1.8 MHz-28 MHz	2.5 µV	-
28 MHz-30 MHz	2.5 µV	0.32 µV
50 MHz-54 MHz	1 µV	0.2 µV
144/430 MHz	0.5 µV	0.16 µV

(IPO, ATT off)

Image Rejection:

HF/50 MHz: 70 dB
 144/430 MHz: 60 dB

IF Rejection:

60 dB

Selectivity (-6/-60 dB):

SSB/CW: 2.2 kHz/4.5 kHz
 AM: 6 kHz/20 kHz
 FM: 15 kHz/30 kHz
 FM-N: 9 kHz/25 kHz
 SSB (optional **YF-122S** installed): 2.3 kHz/4.7 kHz (-66 dB)
 CW (optional **YF-122C** installed): 500 Hz/2.0 kHz
 CW (optional **YF-122CN** installed): 300 Hz/1.0 kHz

AF Output:

1.0 W (8 Ohms, 10% THD or less)

AF Output Impedance:

4-16 Ohms

Specifications are subject to change without notice, and are guaranteed within amateur bands only.

Frequency ranges vary according to transceiver version; check with your dealer.

Screw List			
No.	VXSTD P/N	Description	Qty.
①	U9900112	TAPTITE SCREW M2X8B	1
②	U02308001	SEMS SCREW SM3X8	2
③	U04306002	SEMS SCREW HSM3X6NI	1
④	U20205007	BINDING HEAD SCREW M2.6X5B	7
⑤	U23206001	TAPTITE SCREW M2.6X6	1
⑥	U24205001	TAPTITE SCREW M2.6X5	11
⑦	U24306002	TAPTITE SCREW M3X6NI	2
⑧	U31204007	OVAL HEAD SCREW M2.6X4B	2
⑨	U31205007	OVAL HEAD SCREW M2.6X5B	8
⑩	U9900012	TAPTITE SCREW M2X4	2

ACCESSORIES		
Description	VXSTD P/N	VERS.
ANTENNA (YHA-63)	Q3000174	
MIC (MH-31A8J)	A06870001	
CABLE (E-DC-6)	Q9000722	W/O CE
DC CABLE (DC 3A 1500MM)	T9023003	W/ CE
SHOULDER STRAP	S6000397	
FERRITE CORE	L9190128	
FNB-85	AAD71X001	FT-817 _{ND}
NC-72B	A13330001	FT-817 _{ND} (USA)
NC-72C	A13340001	FT-817 _{ND} (EXP)
RUBBER FOOT	S4000049	FT-817 _{ND}

